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Indoor Air Quality – A Maintenance Challenge

People Spend 90% of Their Time Indoors

Indoor Air Quality is not just a trendy topic these days, it is a virtual way of life for plant managers and other facilities professionals. Most people know that outdoor air pollution can damage their health, but over the last several years, measurement studies have shown that the quality of indoor air may be even worse than that of the outdoor air.

"Since people are estimated to spend as much as 90% of their time indoors, the health risks may be greater due to exposure to air pollution indoors than outdoors," according to Dorothy Trethewy, industrial hygienist in the Department of General Administration. "And maintenance professionals can have the greatest impact on IAQ by properly servicing ventilation systems, listening to their tenants, and having a pro-active program in effect."

Fresh air and removal of air is the combination needed to prevent IAQ setbacks, Trethewy says. The most common pollutants generated within a ventilation system are mold spores and bacteria, water-related problems, fiberglass from deteriorating insulation, and common dirt and debris. These components turn from *common* to *extraordinary* when broadcast in building spaces by improperly maintained ventilation systems.

The building design is a crucial factor in setting the stage for IAQ. Indoor conditions are determined by the interaction of four factors: the building itself, the mechanical equipment within the building, the occupant (including occupancy-specific equipment requirements such as furniture), and the outdoor conditions. Each of these four — building, equipment, occupant, and outdoor conditions — is also a potential source of contaminants that could adversely affect indoor air quality. In order for an indoor air quality problem to exist, there must be a way for the contaminant to reach a person at high enough levels to cause health effect.

"This will depend on the building (what passageways exist?) as well as the equipment and outside conditions (what driving forces can make the contaminant move through the building?)," Trethewy says. "The best indicator of ventilation problems relative to IAQ are complaints from tenants — people generally do not complain without reason."

*This is the first **Shop Talk** Topic of the Month, as requested by consortium members. An analysis of last issue's feedback survey is presented on Page 2. For an extensive listing of Indoor Air Quality-Related Resources, see Page 5.*

The Plant Operations Support Consortium

Department of General Administration

Department of Veterans Affairs

Department of Transportation

Department of Labor and Industries

State Parks and Recreation Commission

Department of Social and Health Services

Washington State Patrol

Department of Natural Resources

Department of Corrections

Pierce County

Thurston County

State of Alaska

Big Bend Community College

Marysville School District

Clark College

Military Department

Spokane Community College, Dist. 17

In cooperation with:

Washington Association of Maintenance and Operations Administrators (WAMOA)

Building Operators Management Association (BOMA)

Association of Higher Education Facilities Officers (APFA)

National Association of State Facilities Administrators (NASFA)

Operations and Facilities Council (OFC)

Association for Facilities Engineering (AFE)

Association of Energy Engineers (AEE)

Program Quarterly Statement

A Status Report to the Consortium

Membership Plus: The Plant Operations Support consortium welcomed two new members since the last newsletter: Spokane Community College Dist. 17 and the Military Department. Additionally, three community/technical colleges, four K-12 school districts, two state agencies and two non-profit/public hospitals are in negotiation stages. **Minus:** The Department of Fish and Wildlife chose to postpone membership to an undetermined date.

Client Servicing Client requests numbered 213 from June 1st to Sept. 1st, 1996, and spanned a broad spectrum of operational

areas. Requests ranged from women's softball diamond dimensions for a community college, to major benchmarking and standards data studies for two state agencies. Clients have requested IAQ/ASHRAE, MEANS and IFMA standards assistance; while others have inquired of automated PM modules and other CMMS-related venues. Still others needed specific points of contact and/or answer to a problem in a maintenance or construction-related field. The program's responsiveness and linkage via Internet have resulted in a number of requests for comparison data from institutions and comparable states. More than 550 separate E-Mails and 75 Faxes were received or sent from June 1st to Sept. 1st, 1996. The program manager completed 16 on-site assistance visits around the state. A focused effort directed at Lower Columbia Community College resulted in high-end computer programming/engineering aid and actual capital project completion.

Program Media The program's web site received 414 "hits" from June 1 to Sept. 1 1996. Eight requests for membership have been linked directly to the web page and search engines. **Shop Talk** newsletter was printed in 1200 copies, mailed to 555 plant/facilities managers and distributed during conferences and workshops. Forty-seven feedback survey forms were returned. Fax on Demand is high on the priority list

and should be on-line by November 1st. The latest addition to the **Best Practices** series was published and is in process of distribution. The mailing list will form the core of the first Access® database.

Professional Development Series Responding to client requests, the program now sponsors a series of workshops/forums designed to spotlight innovative, leading edge practices in the private and public facilities arena. The first workshop took place in July and covered roof maintenance, leasing and technological advances. An IAQ workshop was well-received and attended on Sept. 26th in Olympia. More than sixty five reservation requests from 32 agencies were recorded for the event. Seminars on energy-related issues and ADA maintenance considerations are planned for Oct. 29 and Nov. 21, respectively.

Program Prototypes A total of 22 program prototypes are available for review/copying for member use. The most popular to date have been the Emergency Preparedness Manual, EPA CFC phase-out compendium and Life Cycle Assessment model by Battelle. The prototypes will eventually be transferred to electronic format for easy access through Fax on Demand.

Questionnaire Results

A feedback mailer was included in the Summer issue of Shop Talk. The questionnaire listed a number of topic areas that might be of interest to the newsletter's target audience, as well as space for comments and address correction or additions. Forty seven feedback questionnaires were returned. Of the 47, seven included data only, 40 marked the subject blocks and six included comments.

Questionnaire Questions/Statistics

What plant operations and facilities management issues, topics or other information would be helpful to you?

Topic/Subject
Total # Forms with Topic Marked

Indoor Air Quality	31
Regulatory/Safety	26
Automation Systems	25
Emergency Prep	23
Staffing	21
Resource/Funding	19
Trades-Specific	14
Facilities Case Studies	14
Work Management	10
Labor/Collective Bargaining	6
Legislative Issues	3
Personnel/Merit System	0
Other	0

6 feedback forms listed additional comments:

"The program would be well-served to include Indoor Air Quality forums."

"Publication or seminar on door hardware installation, maintenance and keying."

"Safety and Emergency Preparedness are items we always need help with."

"I read the newsletter and found it quite informative...custodial info would be helpful."

"Where is a successful automated PM module we can use as a test case?"

"Benchmarking and standards need increased visibility and support."



Shop Talk is a quarterly publication of the Plant Operations Support program. The newsletter is intended to be an informative and operationally-oriented medium for public facilities managers. Contents herein are also available on the program's web site at <http://olympus.dis.wa.gov/pub/eas/ga/plantops.htm>

We welcome feedback on the newsletter's contents and input from readers. We reserve the right to edit correspondence to conform to space limitations. Bob MacKenzie, program manager and editor, (360) 902-7257 or e-mail bmacken@ga.wa.gov

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Department of General Administration,
P.O. Box 41012, Olympia, WA 98504-1012. John Franklin, Director

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Case Study – University of Virginia

University of Virginia's facility inspection program provides a low-cost solution for identifying and addressing deferred maintenance

In 1980, the University of Virginia (UVA) began a facilities inspection program that has run continuously since. The program was originally set up to catalog all building deficiencies in order to generate a Facilities Condition Index (FCI) which is the deficiency total divided by the replacement value of the facility. The State of Virginia required the FCI to use in allocating a newly-created Maintenance Reserve Fund for the upkeep of state-funded institutions of higher education.

UVA's approach was to catalog their deficiencies on a four-year inspection cycle which they have done for 16 years. Some buildings have been inspected by the two full-time inspectors as many as five times since 1980. In addition to the

two inspectors there is an Inspection Program Manager who devotes about 1/4 of his time managing the inspection schedules and various maintenance budgets.

About two years ago, they began to ask some basic questions about the program, such as "What are we getting out of this effort?" and "Is this the best way to gather the data we need?" They stepped back and took a good long look at what they had accomplished since the time they had begun inspecting their buildings. Their questions included:

- 1) Was there possibly a more cost efficient way to generate the FCI?
- 2) Was there a way to include non-maintenance deficiencies such as ADA compliance and asbestos abatement in with the FCI so as to arrive at a more realistic deferred maintenance backlog?
- 3) Could we begin to spend more

time developing, managing, and prioritizing projects that we were likely to fund rather than waste efforts on

those projects that were less of a priority?, and

- 4) Could we develop a system whereby we could avoid having to reinspect our facilities every four years?

After lengthy review and several intermediate steps, they developed a database that generated the FCI by what they called a "lifecycle cost" method. This allowed them to catalog their buildings deficiencies by component, using the component's age and estimated lifespan to calculate whether it should be included in the deferred maintenance backlog total. They discovered that this approach also solve a multitude of other sins such as the need to re-inspect every four years. With the lifecycle cost



method, the FCI adjusts automatically every year – the only maintenance that is required is to periodically change the age of newly

installed or renovated components. This meant that the inspectors could dedicate the majority of their time to not just identifying maintenance and upgrade projects cut developing a more in-depth cost and program analysis of those projects. They were then better able to strategically manage and coordinate their projects to achieve the biggest bang for their buck.

Future plans include a maintenance master plan whereby projects will be automatically scheduled based on existing program analysis and budgets.

Provided to **Shop Talk** courtesy of Jay Oschrein, Project Manager, University of Virginia, Charlottesville, VA

Money Saving Energy Programs and Services Available Through GA

Even though the Washington State Energy Office officially closed its doors on June 30, new doors immediately opened to offer the best of the best energy programs and services to public agencies. The Public Sector programs and staff, transferred to General Administration (GA), were combined with the energy performance

contracting and Plant Operations Support programs already underway. The combined programs are being offered by the Facilities Engineering Services Group within the Division of Engineering and Architectural Services. The programs include Energy Life Cycle Cost Analysis reviews, Resource Conservation Manager, and Energy Performance Contracting. Energy Education and Plant Operations Support programs are also available. All are designed to save public agencies time and money. The Resource Conservation Manager (RCM) program is a component that attracts a number of different agencies. Currently seven school districts within Washington State

have active RCMs. The RCM program is designed to enhance the management of resource consumption costs. Participants can expect to save 10% on utility budgets by reducing the consumption of energy and water, and solid waste production. The RCM will set up a comprehensive resource conservation program within the facility. The program focuses on improved maintenance and operations with a strong educational component to increase awareness of the impact of resource consumption on the environment. **The money saved by the RCM pays for all related costs.** A two-year pilot project in Oregon saved seven school districts over \$1.3 million dollars. The savings

paid all the costs and returned excess savings to the schools. RCMs have great potential for other public agencies according to Gwen Haynes, RCM State Coordinator. Gwen is working with other school districts, local governments and state agencies to provide RCM services statewide. The Facility Engineering Services Group can also provide facility audits, technical designs, energy consulting services and plant operations interfaces to public facility clients. For more information, contact Ray Anderson at (360) 902-7260.



World Wide Web

A Cyber-Search for Facilities Data

Plant managers have been told that everything they can possibly want to know is on the World Wide Web — somewhere. The trick is finding it. The Web consists of hundreds of thousands of sites, each containing up to thousands of individual pages of information. It is hard to find anything by just wandering, so here are a few of our favorite sites on the Web for trying to track things down.

First, the rules: All the addresses listed in this article start with **http://**. Any periods at the end of the addresses are in fact a period at the end of a sentence and should not be typed in. None of the addresses have hyphens.

Second, a tip: If you own a later version of Netscape and some other Web browsers, you do not have to type in a lot of nonsense. If the address you want looks something like "**http://www.something.com**," all you have to type in is "**something**."

Search

For example, you can find our first site by simply typing "**search**" (without the quotes). Non-Netscape users can find it at **www.search.com**. Search.com is the best-organized collection of Web search engines we know. If you are willing to register on the site — for free, of course — you can even customize the search engines you like best on one

screen. These engines will help you find information you need. You can also tell them how exact you want them to be and how many suggestions they should feed back to you.

Lycos

If you are just looking for a quick, comprehensive search site that lists a lot of pages, check out Lycos at **www.lycos.com**. Click on "**Customize your search**" and you can instruct Lycos to consider all the key words you type in when looking for information. You can also tell it how exact you want it to be and how many suggestions it should feed back to you.

Yahoo

If you are tired of getting back a lot of sites that don't have anything to do with what you want to know; there is always the old favorite: Yahoo. Most search engines use computers to find and index sites. Yahoo still uses humans. You can find it at **www.yahoo.com**, and it remains the biggest collection of edited sites on line.

If any of the above is "Greek" to you, and you are hesitant to plunge into a world of blurred policy limitations, just call your Plant Operations Support program with your search topics. We have literally hundreds of sites bookmarked that have proven useful in client plant operations-related comparison and other research studies. It is a service we do quickly and efficiently. Editor

Professional Development Series

In response to client requests, a professional development series sponsored by the Plant Operations Support Consortium was launched in July, 1996. The first installment covered roofing maintenance and leasing programs. The next second workshop/forum — **Indoor Air Quality** — took place Thursday, Sept. 26. A panel of four industry, government maintenance and compliance experts addressed methodologies, regulatory issues and industry advances. At press time, more than 65 people reserved seating for the event.

The series was developed to enhance plant manager professional development and to promote healthy technological information exchange, according to program officials. A corollary benefit of the series is training available to plant staffs for the right price — free!

An October workshop, designed to explore **energy-related plant operations initiatives and the Resource Conservation Manager program**, is scheduled for Tuesday, October 29, 1-5 p.m. in the General Administration Building auditorium in Olympia. Additional workshop information will be mailed to consortium members and added to the program's web site under, "**Next Event in Professional Development Series**."

Future workshop opportunities will take place in Seattle, Vancouver, Spokane and Bremerton. For further information on a specific event, or to confirm your attendance, call Bob MacKenzie, (360) 902-7257.

Input Requested to November ADA Workshop

An operationally-oriented forum titled **Common Sense Implementation of the Americans with Disabilities Act** is slated for Thursday, November 21, 1:30-4:30 P.M. in the auditorium of the General Administration Building on the Capitol Campus in Olympia. The free forum is sponsored by the Plant Operations Support program and is directed at public agency/plant/project/maintenance managers and other facilities professionals. Forum organizers are asking *Shop Talk* readers and others for workshop input. "You can help us tailor the session to meet your needs by sending in advance the questions or issues you want us to address," said **Pat McLain**, a forum organizer. She can be contacted at (360) 902-7210, PO Box 41000, Olympia, WA 98504 or email (pmclain@ga.wa.gov). Those interested in attending this relevant, informative workshop should confirm seating by calling Shanna Ware (360) 902-7221.

Indoor Air Quality-Related Resources

There is no single organization which operates as, or is acknowledged as, the main player in the indoor air quality field. There are many organizations which have something to do with IAQ. Following are many of which we have become aware, what they have to do with it, and how to contact most of them. Most of them have publications catalogs. Some have toll-free hotline phone numbers and most maintain a presence on the World Wide Web.

AAFA (Asthma and Allergy Foundation of America). A consumer organization. Publishes books, including ways to improve allergy and asthma conditions by improving indoor air quality. (202) 466-7643.

AEE (Association of Energy Engineers). The professional society of engineers in the fields of energy production and conservation. Certifies individuals as "Indoor Air Quality Professionals" through a qualification and test procedure. Sponsors seminars on indoor air quality. (404) 447-5083.

AIHA (American Industrial Hygiene Association). The professional association of industrial hygienists. Publishes a research journal. Provides certification in the sub-specialty of "Indoor Environmental Quality" for Certified Industrial Hygienists. Publishes some IAQ related manuals and booklets. (703) 849-8888.

ARI (Air-Conditioning and Refrigeration Institute). Trade association of the A/C manufacturing industry, sets standards for equipment. (703) 524-8800.

ASHRAE (American Society of Heating, Refrigeration, and Air-Conditioning Engineers). The U.S. professional society of HVAC engineers. Publishes standards. Sponsors research. Publishes a research journal. Holds a yearly symposium on IAQ and publishes proceedings of it. (404) 636-8400.

ASTM (American Society for Testing and Materials). Standard setting organization. (215) 299-5571.

AWMA (American Waste Management Association). A professional association in the fields of air pollution control, hazardous waste disposal, etc. Sponsors symposia on indoor air quality. (412) 232-3444.

CPSC (Consumer Product Safety Commission). This is the U.S. government agency responsible for the safety of consumer products. As such, they regulate such devices as humidifiers and room air cleaners. Product Safety Hot-Line 1-800-638-CPSC.

EPA (Environmental Protection Agency). The U.S. government agency charged with protection of the environment, both indoor and outdoor. Has a small "Indoor Air and Radiation" division, which seeks to improve indoor air quality by publication of materials on the subject, and by persuading voluntary agreement to uphold improved standards. Has no enforcement authority in regards to indoor air quality. Sponsors research. Has a hotline you can call with IAQ questions: 1-800-438-4318.

NADCA (National Air Duct Cleaners Association). The professional association of ventilation system cleaning companies. Publishes standards on cleaning of ducts. Certifies duct cleaning companies (program just now beginning). (202) 737-2926.

NAFA (National Air Filtration Association). Association of air filter manufacturers. Publishes an introductory book on types of filters, their efficiency, applications, etc. 1518 K Street NW, Washington, DC 20005.

NCIAQ (National Coalition on Indoor Air Quality). A coalition of other organizations which have something to do with indoor air quality, including NADCA, NAFA, and others. Holds a yearly conference on indoor air quality.

NEHA (National Environmental Health Association). A private non-profit association, it is mainly involved in public health issues. They do publish a self-teaching guide and reference manual on indoor air quality. (303) 756-9090.

NIOSH (National Institute of Occupational Safety and Health). The U.S. government research agency on the subject of occupational safety and health, including workplace indoor air quality. Performs and sponsors research. Publishes manuals. Has a publications department which provides many publications for free. NIOSH also has a hazard evaluation section which may send a team out to investigate your indoor air quality complaint situation, depending on the seriousness and uniqueness of the event. It may take some months for them to respond if they do take your case on, depending on backlogs. Requests for field evaluations: Hazard Evaluations and Technical Assistance Branch (R-9). (513) 841-4382. Information hotline: 1-800-35NIOSH. Publications: (513) 533-8287.

NIST (National Institute of Standards and Technology). A U.S. government research agency which sets standards on methods of testing (formerly known as the National Bureau of Standards). Its Building And Fire Research Laboratory performs research on some aspects of indoor air quality, particularly measurement of ventilation efficiency, and makes results available in publications. Gaithersburg, MD 20899.

OSHA (Occupational Safety and Health Administration). The U.S. government agency responsible for workplace health and safety. They are primarily involved in industrial issues such as toxic chemical exposure, dangerous machinery, etc. However, as noted, they have now proposed indoor air quality rules for commercial work place. Office of information: (202) 219-8151.

WHO (World Health Organization). International governmental organization which monitors and works to improve health conditions world-wide. Has a committee on indoor air quality which sponsors research, publishes findings, and issues guidelines in regards to indoor air quality.

WISHA (Washington Industrial Safety and Health Act). The nation's first fully operational state safety and health plan approved by the federal government. WISHA gives the Department of Labor and Industries a primary responsibility for worker health and safety in Washington state. Call the Industrial Hygiene consultant in your L&I regional office.

Members Helping Members

Facilities Inventory Exceeding Your Maintenance Capabilities? *There's Help Available*

Some public agencies have found relief from maintenance burdens by decreasing their facilities inventory—taking facilities off-line. To advertise and manage disposal, they've called GA's Division of Property Development.

Real estate services are available from the Department of General Administration's Division of Property Development (DPD) to any state agency, board, commission, college, etc., per RCW 43.82.010. These services range from leasing, design, or property management services to acquisition or disposal of real property. Anything above DPD's basic services are charged at an additional hourly rate, depending upon the type of service requested. To obtain additional information, please contact DPD at (360) 902-7373.

Post-Quake Assessment Video

A new post-earthquake facilities damage assessment video may be just the tool for plant managers to prepare their staffs for the unthinkable. The video was produced jointly by the Washington State Department of Transportation, Federal Emergency Management Agency (FEMA) and the State Emergency Management Office and is intended for national distribution.

When WSDOT was taking part in the state's annual earthquake preparedness exercise last April, Emergency Management program workers noticed a void. There were no practical training guidelines that would give the department's building inspectors a realistic visual of how to evaluate the safety of structures after a quake.

Sanctioned by the Federal Emergency Management Agency (FEMA), the training was credited as being excellent, explained Tom Trask, who was

Information At Your Fingertips

24 hour, 7 days a week access to information will soon be accessible to all program clients

Many Plant Operations Support program products will soon be available by simply using your touch-tone phone and fax machine. Program prototypes, information sheets and research projects will soon be available via the Fax on Demand system. Now, any plant manager with a fax machine can utilize a variety of products. Simply dial (360) 664-2444 for Fax on Demand and follow the menu choices for requesting the documents you want. A user diagram and more information about Fax on Demand will be sent to you. We will also be using Fax on Demand for "broadcasts" to customers on important up-to-the-minute information. If we don't have your fax number, now is the time to send it to us.

instrumental in the production of the video, "but it didn't give them the practical experience needed to inspect buildings."

The resultant facilities damage assessment video fills the void. Ron Niemi, of the WSDOT Facilities Office, helped carry off the project that holds "great potential for small plant operations staffs concerned with emergency planning."

For more information, contact Terry Simmonds, WSDOT's Emergency Management Program Manager, at (360) 664-9494.